REMARKS

Claims 1-40 are pending in the current application. In Office Action dated November 25, 2008, the Examiner rejected claims 1-3, 20-23, and 40 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent 6,348,700 ("Ellenbogen"). The Examiner objected to claims 4-19 and 24-39 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and intervening claims. Applicant's representative traverses these rejections.

Applicant's representative asserts that the Examiner has not established that claims 1-3, 20-23, and 40 are anticipated under 35 U.S.C. §102 by Ellenbogen because the Examiner has not shown that Ellenbogen teaches a molecular switch or a method of switching satisfying the requirements of 35 U.S.C. §102 as interpreted in the long standing case law. Applicant's representative has repeatedly explained to the Examiner in a prior response dated November 20, 2007 and in an appeal brief dated August 19, 2008 how to properly apply 35 U.S.C. §102. Applicant's representative herein describes for a third time how to properly apply 35 U.S.C. §102 as follows.

M.P.E.P. §2131 quotes holdings from cases directed to interpreting and applying 35 U.S.C. §102 as follows:

> (1) a claim is anticipated only ***if each and every element as set forth in the claim is found***, either expressly or inherently, in a single prior art reference *Verdgaal Bros. v. Union Oil Co. of California*, 814 F.2d 628 (Fed. Cir. 1987),
>
> (2) ***the identical invention must be shown in as complete detail as is contained in the claim*** *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226 (Fed. Cir. 1989), and
>
> (3) ***the elements must be arranged as is required by the claim***, *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

The Examiner's one paragraph argument in the current Office Action relies on passages from Ellenbogen that relate to disparate molecules none of which are assembled by Ellenbogen to anticipate rejected claims 1-3, 20-23, and 40. In particular, Ellenbogen describes a number of different types of molecules and molecular devices in the background and in the detailed description of Ellenbogen. However, in spite of the rule of law regarding how to apply 35 U.S.C. §102, the Examiner wrongly interprets 35 U.S.C. §102 to mean that it is the Ellenbogen reference that anticipates claims 1-3, 20-23, and 40. In other words, the Examiner wrongly applies §102 to mean that all that is needed to argue that Ellenbogen anticipates claims

1 and 21 is to cite various passages of Ellenbogen without establishing that Ellenbogen assembles these passages to describe a molecular switch comprising the elements as claims 1-3 and 20 or a method of electronically switching a molecule switch comprising the same elements as claims 21-23 and 40.

According to *Verdgaal Bros*, *Richardson*, and *In re Bond*, the Examiner has the burden of proving that Ellenbogen describes a molecular switch and method of switching a molecular switch comprising each and every element of claims 1 and 21, that is described in as complete detail as contained in claims 1 and 21, and not only includes the same elements, but these elements must be arranged in the same manner as the elements in claims 1 and 21. The Examiner, in a short one paragraph argument, has not met this burden.

In addition, the Examiner ignores certain elements of claims 1 and 21 that are not found in Ellenbogen.

Response to the Examiner's One Paragraph Argument

First, the Examiner's one paragraph argument is vague. It is unclear how the cited passages and single sentence summary of the cited passages from Ellenbogen anticipate which claim elements or which of the rejected eight claims these passages relate to.

Second, it is assumed the Examiner identifies a molecule described with reference to Figures 9A-9C of Ellebogen as a molecular switch. However, the Examiner wrongly attempts to import elements and limitations from a general discussion of different types of molecules provided in the background section of Ellenbogen into the molecule described with reference to Figures 9A-9C in order to anticipate claims 1 and 21. For example, the general structure of the molecule identified by the Examiner is shown in Figures 9A-9B of Ellenbogen and is described by Ellenbogen in col. 8, lines 6-14 as follows:

> "Referring to FIGS. 9A and 9B, a rectifying diode 10 has a molecular structure 11 which is based on a polyaromatic conducting wire 12 which comprises a plurality of sequentially bonded substantially identical aromatic ring structures 13. As applied herein, a molecular conducting wire is a single molecule having a plurality of substantially identical ring structures bonded or linked together, sequentially and/or in parallel, that form an electrically conductive molecular chain or mesh."

Ellenbogen also describes the molecular structure 11 as follows:

> "The single molecule 11 has two sections 14 and 15 thereof separated by an insulating group 16, represented by an R. The section 14 of the molecule 11 is doped by at least

> one electron withdrawing group, represented by a Y, bonded thereto. The section 15 of the molecule 11 is doped by at least one electron donating group 18, represented by an X, bonded thereto. The aromatic rings are linked together with respective X and Y group dopants being bonded to one or more sites of the respective sections of the conducting wire."

Ellenbogen then proceeds to describe an example of the molecular structure 11 in greater detail in col. 8, lines 26-28 and with reference to Figure 9C as follows:

> "An insulator 16 is incorporated into the conducting wire by bonding a saturated aliphatic group, or a group having a predominate aliphatic character with respect to electron transport (no pi-orbitals), therein. The addition of the insulator 16 divides the conducting wire into two sections 14 and 15. The section 14 is doped to form an electron acceptor site, and the section 15 is doped to form an electron donor site."

However, the Examiner imports disparate and unconnected portions of the background into the molecular structure 11 as follows:

> "The aliphatic group is insulating and provides a barrier which is amenable to tunneling (col. 1, lines 14-23, col. 8, lines 61-67, and col. 9, lines 1-25). The delocalization of the pi bonding orbital results in conduction band (col. 2, lines 62-67 and col. 3, lines 1-8) energy states. The aliphatic chains which are inserted in portions of the molecule make rotation possible (col. 3, lines 10-20, 25-37, and col. 4, lines 35-65 and col. 6, lines 3-7)."

It is unclear from the Examiner statements how these cited passages from the background are in anyway connected to the molecular structure 11 of Figures 9A-9C. Ellenbogen provides these descriptions of molecules in the background in order to distinguish the structure and operation of the molecular structure 11 from other ways in which the molecules described in background have been operated by others. The Examiner also does not appear to understand how the molecular structure of Ellenbogen is operated. The Examiner's statement that "[t]he aliphatic chains which are inserted in portions of the molecule make rotation possible" is **not** how the molecular structure 11 is operated and contradicts the actual description of the operation of the molecular structure 11.

Beginning in col. 8, line 61 and ending in col. 9, line 65, Ellenbogen with reference to Figures 9D-9F describes the electronic properties of the molecular structure 11. In particular, in col. 8, line 61 to col. 9, line 8 as follows:

> "Comparing the molecular structure 11 shown in FIG. 9C with potential energy diagrams shown in FIGS. 9D and 9E, it may be observed that ***the insulating group 16 in substantially the middle of the molecule 11 is associated with a potential energy***

> ***barrier 20. There are also barriers 21 and 22 between the molecule 11 and the conductive contacts*** (for instance gold) 23 and 24 at either end of the molecule 11 formed by substituents .omega. having a characteristic for selective attachment in the particular atomic or molecular structure of the contacts 23, 24. *These barriers 20, 21, and 22 serve to maintain a degree of electrical isolation between the different parts of the structure, sufficient to prevent the energy levels of the sections 14 and 15 from coming into equilibrium.* ***However, none of these barriers are so wide or high as to completely prevent electrons under a bias voltage from tunneling through them.***"

The molecular structure is operated as a diode by applying a forward bias that is large to enable ***electrons to tunnel*** through the barrier 20 as explained in col. 10, lines 5-55. In particular, Ellenbogen describes with reference to Figure 9D that

> "As shown in FIG. 9D, a forward voltage bias has been placed upon the molecule 11 of FIG. 9C, with a high voltage on the contact 24 (left hand contact) and a lower voltage on the contact 23 (right hand contact), then the electrons in the occupied quantum levels of the lower voltage right hand section 14 are induced to flow from right to left through the molecule 11 to reach the higher voltage right hand section 15. That flow of electrons is a result of an energy differential formed by the applied bias voltage, the electrons being drawn to the section having an opposite charge." (col. 10, lines 7-16)

> "[i]f the Fermi energy of the contact 23 is raised up to or above the energy of the LUMOs on the acceptor section, by the forward bias voltage, the electrons can tunnel from contact 23 into the empty LUMOs immediately to the left. Then, ***the electrons can tunnel to the left,*** once again, through the central insulating barrier 20 to the unoccupied manifold of molecular orbitals in the donor section 15 of the molecule 11." (col. 10, lines 36-44)

With reference to the energy diagram in Figure 9E, Ellenbogen also describes operation of the molecular structure 11 under a reverse bias as follows:

> "On the other hand, it is not so easy a matter to start electron flow when a reverse bias voltage has been placed upon the molecule 11, as illustrated schematically in FIG. 9E. In the reverse-bias case, with the higher voltage on the contact 23 and the lower voltage on the contact 24, the electrons in the right hand contact 24 normally would tend to flow from left to right through the molecule 11. To actually start this electron flow, though, the reverse bias voltage must be sufficient to raise the Fermi energy of the contact 24 so that it is at least as high as the energy of the LUMO pi-orbitals in the donor section 15 of the molecule 11. In the reverse bias case, however, the amount of voltage that must be applied is considerably greater than in the forward bias case, in order to raise the Fermi energy"

> "As shown in FIG. 9E, the same amount of voltage is applied in the reverse direction as is used in the forward direction (FIG. 9D), and such is insufficient to allow electrons to tunnel from the contact 24 into the LUMO energy level of the molecule

> 11. The different forward and reverse bias characteristics of molecule 11 defines the classic behavior of a rectifying diode, which is symbolized by the schematic symbol shown in FIG. 9A."

In the entire description of the operation of the molecular structure beginning in col. 10, line 5 and ending in col. 11, line 45 there is not mention of rotating any portion of the molecular structure 11 or in any way changing the molecular conformation of the molecular structure 11 to alter the diode properties of the molecular structure 11.

The Examiner also has not identified a molecular structure of Ellenbogen that under the influence of an electric field induces:

> "non-redox type of band gap change resulting from an intramolecular change in conjugation as p,π-electrons of the molecular system"

In particular, the Examiner has not identified a molecular switch in Ellenbogen with a band gap change that occurs via ***one of the following mechanisms***:

"(1) ***molecular conformation change*** or an isomerization;

(2) ***change of extended conjugation*** via chemical bonding change to change the band gap; or

(3) ***molecular folding or stretching***,"

As already explained above, the Examiner has not identified a molecular structure of Ellenbogen or method of molecular switching that exhibit these properties.

Thus, claims 1 and 21 are not anticipated by Ellenbogen. Dependent claims 2-3, 20, 22-23, and 40 are allowed as depending from allowable base claims 1 and 21.

In Applicant's representative's opinion, all of the claims remaining in the current application are clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,
XIAO-AN ZHANG ET AL
OLYMPIC PATENT WORKS PLLC

Richard L. Bell
Reg. No. 54,614
Attorney for Applicants

Enclosures:
postcards (2)
Transmittal in duplicate

Olympic Patent Works PLLC
P.O. Box 4277
Seattle, WA 98194-0277
206.621.1933 telephone
206.621.5302 fax